

Interpretation of Environmental Contaminant Values

This Internet Mapping Service contains an extensive number of values for contaminant concentrations in biota, water, and sediments. The significance of these values must be evaluated relative to established reference values, some of which have regulatory and/or legal implications. Such an undertaking is not trivial as there are many laws and regulations that deal with contaminants in the environment. In addition, the results of past and on-going research have contributed to an extensive body of knowledge concerning the toxicological and ecological significance of environmental contaminants. Thus, it would be impossible within the context of this project to adequately describe the significance of each particular contaminant concentration and the ways in which it can be interpreted. However, the following discussion attempts to provide a broad overview of the topic and directs the user to various sources for more detailed information.

The intended use of a chemical will determine the authorities under which it is regulated. The registration and use of pesticides are regulated by the US EPA under the Federal Insecticide, Fungicide, and Rodenticide Act [1]. Chemicals used for general industrial use, and some household uses, are regulated by the US EPA under the Toxic Substances Control Act [2]. Chemicals used as food additives, drugs, or in cosmetics are generally regulated by the US FDA under the Food, Drug, and Cosmetics Act [3]. Incidental contaminants (i.e. chemicals that may be bi-products of manufacture without an actual intended use) may fall under any of a number of alternative legal processes that deal with pollution including the Clean Water Act [4], or the Natural Resources Damage Assessment and Remediation Process [5].

Regulatory threshold values for a given contaminant differ depending on the environmental compartment (biota, water, sediment, etc.) in which it occurs. Moreover, a particular contaminant may be regulated by federal, state, and often local entities, all of which may establish slightly different criteria as action levels. For example reference values for waterborne contaminants are promulgated as National Water Quality Criteria established by the US EPA [6] and are generally enforced as state water quality standards, e.g. [7]. Furthermore, the allowable level may be different depending upon the designated use of the water body, e.g. [8]. The same contaminant in fish tissue may be subject to regulation by the US FDA as an action level [9] and/or may result in a fish consumption advisory issued by a state's department of natural resources, public health department, or fish and game commission, e.g. [10]. Local recommendations may also apply. Contaminant levels in other types of biota (birds, invertebrates, mammals, amphibians, reptiles) may fall under similar regulations if they serve as human food sources, but more often those values are interpreted in terms of their toxicological significance to the organism itself and to other wildlife that may prey upon them. Ecological considerations such as these are often of interest to the U.S. Fish and Wildlife Service [11] and state departments of fish and game. Finally, special considerations may apply to endangered species [12] and to the pollution of lands held in public trust [13]. A variety of laws address the authority of various agencies to deal with contaminants in aquatic sediments [14 & 15].

With such a wide range of regulations pertaining to environmental contaminants, it becomes clear that a simple table of reference values would be outside the scope of this project. As an alternative, we offer the web links noted above and those listed below as starting points for evaluating the legal, regulatory, and toxicological significance of contaminant values contained in our databases.

- [1] <http://www.epa.gov/region5/defs/html/fifra.htm>
- [2] <http://www.epa.gov/region5/defs/html/tsca.htm>
- [3] <http://www.fda.gov/opacom/laws/fdcact/fdctoc.htm>
- [4] <http://www.epa.gov/region5/water/cwa.htm>
- [5] <http://www.epa.gov/superfund/programs/nrd/primer.htm>
- [6] <http://www.epa.gov/waterscience/standards>
- [7] http://www.tceq.state.tx.us/permitting/water_quality/wq_assessment/standards/WQ_standards_intro.html
- [8] http://www.texasep.org/html/wql/wql_1swq_stand.html
- [9] <http://www.cfsan.fda.gov/~lrd/fdaact.html>
- [10] http://www.tpwd.state.tx.us/publications/annual/fish/consumption_bans
- [11] <http://www.fws.gov/contaminants>
- [12] <http://www.epa.gov/region5/defs/html/esa.htm>
- [13] <http://restoration.doi.gov>
- [14] <http://www.epa.gov/waterscience/cs/aboutcs>
- [15] <http://www.epa.gov/waterscience/cs/guidelines.htm#epa>

Other web links of interest:

Ecological Risk Assessment:

<http://www.epa.gov/region5/superfund/ecology/html/screeningbench.html>

Physical and Chemical Properties:

<http://chemfinder.cambridgesoft.com>

Toxic Properties:

<http://atsdr1.atsdr.cdc.gov:8080/toxfaq.html>

<http://www.cerc.cr.usgs.gov/data/acute/acute.html>